

REMARKS

The above amendments and these remarks are responsive to the Office action dated November 26, 2003. Claims 17-21, 23-27, and 29-33 are pending in the application. In the Office action, the Examiner has applied a combination of Kuzma (U.S. 5,754,700), Manning (U.S. 5,519,790) and Robotham et al. (U.S. 5,627,765) to reject each of the pending claims. In view of the amendments above, and the remarks below, applicant respectfully requests reconsideration of the application under 37 C.F.R. § 1.111 and allowance of the pending claims.

Background

The Examiner has applied a combination of Kuzma (U.S. 5,754,700), Manning (U.S. 5,519,790), and Robotham et al. (U.S. 5,627,765) under 35 U.S.C §103 in rejecting various claims. However, before discussing why the combination is improper, as well as the differences between the claims and the applied references, applicant believes it would be helpful to briefly review the background of the present application.

As described in the specification, the present application relates to a system that projects a digital image that is converted from a sampled analog video signal, where the sampling and conversion are concurrent with the digital display. See pages 1-5 of the specification. Further, the present application describes various approaches for overcoming significant technical hurdles in this

technology experienced by prior approaches. See pages 5 and 12 of the specification.

One example issue described in the specification that relates to performing the displaying of a digital version of an analog display is that there can be errors in the pixel clock sampling of the analog signal. See page 5, lines 7-15 of the specification. These sampling phase errors, as well as tracking errors, can generate small differences in the digital pixels which is really just noise, yet screen updates occur, thereby potentially wasting bandwidth and memory. And while attempts have been made to reduce the sampling errors, the dynamic nature of phase noise and tracking have made these errors persist. See pages 5-7 of the specification.

Another issue relates to the fact that devices generating digitally converted images generally refresh the screen display at rates of 60 – 80 Hz (60-80 frames per second) or more to provide a quality image and to avoid eye fatigue. However, the human eye perceives only a portion of the frames, approximately one every 16 milliseconds, or about $1/6^{\text{th}}$ of the frames displayed at 60 Hz. See page 12, lines 3-7 of the specification.

Therefore, the inventors herein have recognized that it is possible to reduce the number of frames sent to the device without impairing the perceived quality of the image. Further, a reduction in the number of frames sent to the device is particularly desirable in a wireless network environment, or where the device is capable of providing its own frame memory, as it reduces the amount of

bandwidth (and memory) necessary to transmit the frame data between the multimedia projection display system and the display object. See page 12, lines 7-12 of the specification.

In other words, one example approach followed in the present application is based in part on the observation that selectively sending new frames only when there is a perceptively significant change in the frame data not only reduces the number of frames sent to the device, thereby reducing bandwidth requirements, but also can improve the overall quality of the perceived image by eliminating unnecessary phase noise and distortion in the digitally converted image. See page 12, lines 13-18 of the specification.

Claim 34

New claim 34 shows one example approach for addressing the above identified issues. Support for Claim 34 is found in various locations of the specification, such as, for example: pages 5, 8, 12-13, 19-22, Figures 8-10, and the originally filed claims.

Claim 34 states:

A method comprising:

sampling a signal of an analog video to generate a plurality of frames of digitized image data, each frame having a plurality of pixel values; and

substantially during said sampling, repeatedly:

selecting a sampled frame when pixel values differ from

pixel values of a previously captured frame by a threshold amount and eliminating said sampled frame when pixel values fail to differ from the pixel values of the previously captured frame by the threshold amount;

capturing said selected sampled frame into a memory;

transmitting said captured frame to a display object; and

projecting said transmitted captured frame by said display object to replicate said analog video.

In this way, it is possible to have a digital projection of the analog image substantially during the sampling of the analog image that has reduced error while at the same time requiring less bandwidth and memory.

None of the references previously applied (Kuzma, Manning, and Robotham et al.) are directed to digital projection systems, and none of them recognize that the above-identified issues relate to digital projection systems, or how to overcome those issues. The details in support of this conclusion are set forth below.

Kuzma (the primary reference)

As stated in the abstract and throughout the specification, Kuzma specifically deals with “non-real time sensitive applications.” Further, Kuzma defines this as “those for which transmission delay of ½ second or more is not degrading to the application usefulness.” Col. 2, lines 12-14. As described in applicant’s specification at page 12, for example, the present application relates

to capturing and displaying multiple images per second without impairing the perceived quality of the image to the viewer. Furthermore, as discussed above, the present application relates to issues that are highly sensitive to sampling, digital conversion and memory capture, and transmission for concurrent display. Thus, applicant respectfully submits that Kuzma would be summarily dismissed by one skilled in the art as teaching away from the present application. Furthermore, there is also not even a hint in Kuzma of how to adapt its approach to digital projection systems.

Applicant therefore respectfully submits that claim 34 patentably distinguishes Kuzma.

Manning and Robotham et al. (Secondary References)

Like Kuzma, neither Manning nor Robotham et al. provide any discussion of adapting their respective approaches to a projection system.

Furthermore, neither provides any suggestion to use their respective approaches in a system that projects a digital replica of an analog image substantially during capture of the analog image.

Thus, since neither Manning nor Robotham et. al. cure the above deficiencies of Kuzma, but rather provide even further reasons in support of the non-obviousness of claim 34, claim 34 should be allowed.

Claims 17, 23, and 29

Claim 17 shows still another example approach for addressing the above-identified issues. Claim 17 has been amended to specify that the sending of the captured frames to the display object occurs substantially during said analog to digital conversion. Support for this amendment is found in various portions of the specification, such as, for example at page 18, lines 9-20 and page 19, lines 18-25.

Claim 17 states:

A method comprising:

converting a frame of analog image data to a frame of digital image data;

capturing the frame of digital image data;

converting subsequent frames of analog image data to frames of digital image data;

comparing pixel data of the converted subsequent frames to pixel data of the captured frame to identify a converted subsequent frame having pixel data that differs from the pixel data of the capture frame by a threshold amount;

capturing the identified frame;

sending the capture frames to a display object that projects the captured frames to replicate said analog image data substantially during said analog to digital conversion; and

eliminating frames having pixel data that fail to differ from the pixel data of the captured frame by more than the threshold amount.

In this way, it is possible to have a digital projection of the analog image available substantially during capture of the analog image.

The above approach is in stark contrast with the references applied by the Examiner. As discussed above, none relate to digital projection systems that provide for efficient, low noise, digital projection that replicates the analog image substantially during capture of the analog image.

Specifically, as noted above, Kuzma teaches away from such an approach by stating that its approach is suitable for "non-real time sensitive applications." Further, applicants respectfully submit that Kuzma fails to show sending captured frames to a display object that projects the captured frames to replicate analog image data substantially during the analog to digital conversion that creates the captured frames. This is clear since the Examiner has admitted that Kuzma fails to show even "sending the captured frames to a display object." Page 2 of Paper #21.

Further, applicant respectfully submits that neither Manning nor Robotham et al. contain such a feature. Specifically, applicant can find no description in Manning that its display replicates analog image data substantially during analog to digital conversion.

Finally, applicant can find no description in Robotham et al. of analog to digital conversion at all, other than a brief mention in the Field of the Invention that "In video applications, analog video is digitized and stored on appropriate magnetic or electro-optic media in a compressed form for later retrieval for

purposes of editing.” Col. 1, lines 12-15. As such, there can be no disclosure in Robotham et al. of sending captured frames to a display object that projects the captured frames to replicate analog image data substantially during the analog to digital conversion that creates the captured frames.

Thus, since Kuzma, the primary reference, teaches away from the claimed invention, and the secondary references fail to cure the deficiency of Kuzma, the rejection of claim 17 should be withdrawn. The above arguments also apply to claims 23 and 29.

Remaining Claims

The remaining claims depend from claims discussed above and therefore should be allowed.

Conclusion

Applicant believes that this application is now in condition for allowance, in view of the above amendments and remarks. Accordingly, applicants respectfully request that the Examiner issue a Notice of Allowability covering the pending claims. If the Examiner has any questions, or if a telephone interview would in any way advance prosecution of the application, please contact the undersigned attorney of record.

CERTIFICATE OF MAILING

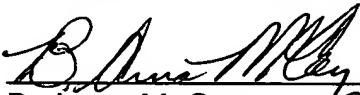
I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail, postage prepaid, to: Mail Stop NON-FEE AMENDMENT, Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on February 26, 2004.



Lisa Holstein

Respectfully submitted,

KOLISCH HARTWELL, P.C.



B. Anna McCoy
Registration No. 48,077
Customer No. 23581
Attorney for Applicant
520 S.W. Yamhill Street, Suite 200
Portland, Oregon 97204
Telephone: (503) 224-6655
Facsimile: (503) 295-6679